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ABSTRACT

Standards-based systems generally require students to meet the performance level specified in order to proceed or be certified. This issue of the Oregon School Study Council (OSSC) Bulletin surveys the types of standards currently being proposed. After an introductory chapter, chapter 2 describes eight components of standards, illustrated with a mathematics skill standard drawn from Oregon's Proficiency-based Admission Standards System (PASS). The chapter also discusses opportunity-to-learn standards and gives two examples of performance-standard systems. Chapter 3 describes initiatives and work on standards at the international, national, state, and local levels. The fourth chapter examines the future of standards. To date, business has been the primary advocate of educational standards. This is because: (1) the language of standards is familiar to business; (2) business sees itself as a consumer of the products of the education system; (3) many industries need smarter consumers and workers. Finally, higher education institutions may end up supporting standards as a consistent quality-control tool that prepares students for college work. (Contains 16 references.) (LMI)

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David T. Conley

Oregon School Study Council
April 1997 • Volume 40, Number 3

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OSSC BULLETIN

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David T. Conley

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Preface

When educators speak of performance standards, they are determining what it is that students should be able to do as a result of the education they receive. Standards are statements that delineate those behaviors, knowledge, and skills most valued in the educational process. They indicate the goals students and teachers should pursue and provide a reference point against which student performance can be measured. Standards can be stated in terms of the content students are to master or in the form of broader intellectual processes that cut across subject areas.

The creation and use of performance standards suggest a new relationship of teacher to learner and learner to learning; it is not enough simply to offer learning experiences if the learner cannot demonstrate the ability to apply the learning at some point in a meaningful way. Failure cannot be an acceptable result of teaching; the system has to be designed to ensure that essentially all students are capable of reaching the specified standards.

This issue of the OSSC Bulletin was cooperatively prepared by OSSC and the ERIC Clearinghouse on Educational Management (ERIC/CEM) at the University of Oregon. The text has been excerpted from *Roadmap to Restructuring: Charting the Course of Change in American Education*, second edition, by David T. Conley, ERIC/CEM, forthcoming.

David T. Conley is an associate professor in the College of Education's Division of Educational Policy and Management at the University of Oregon. He teaches courses on school restructuring, school improvement, educational leadership, teacher leadership, and supervision and evaluation. Conley has conducted studies of schools involved in restructuring and has published extensively on issues integral to restructuring.

Conley contributed to the development and implement and implementation of Oregon's recent landmark school restructuring bill, the Oregon Educational Act for the 21st Century Act. Currently, he is facilitator for a two-tear U.S. Department of Education grant that is enabling nine schools to

take "the next step" in restructuring.

Before joining the faculty at the University of Oregon, Conley spent eighteen years serving as a school administrator and teacher in Colorado and California.

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Introduction

No other single change has promoted as much excitement (both positive and negative) as has the notion of performance standards. In short, performance standards are any set of measures against which students are assessed. Although individual teachers can and often do have standards, the term as used here refers to standards that are consistent across schools in a district or state. Individual teachers do not develop their own standards, though they are responsible for applying the district's or state's standards.

Standards-based systems generally require students to meet the performance level specified in the standard in order to proceed or be certified. This differs dramatically from the current system, where students put in a specified amount of time, then move to the next learning level or experience with no assurance of the knowledge and skill level they have attained. The method of assessment, or required level of performance, is also set external to the individual teacher's classroom. The teacher may or may not have a role in determining whether the student meets the standard.

The implications of a standards-based system are profound. So are the concerns it has raised. On the surface it would seem that few would disagree with making education more accountable to ensure students actually have learned what they have been taught. In practice, disagreement has been sharp over this approach. The reasons for disagreement are manifold and often go far beyond the technical aspects of a performance-based learning system to include philosophical views on the proper role of the school and the family in child rearing.

Many types of learning systems have been labeled as standards-based

recently. However, a standards-based system must meet the following criteria to be included in this discussion:

1. It must be teachable.
2. It must be assessable given current assessment technology.
3. It must represent a higher level of achievement than students generally reach in the current system.
4. It must be in a form that is communicable and comprehensible to students and parents.
5. It must cause teachers to adapt instruction to ensure students meet standards, rather than simply overlaying standards onto existing curriculum and instruction with little change in content or methods.
6. It must provide support for students who are not able to meet standards initially.

This Bulletin surveys the types of standards currently being proposed. Chapter 2 describes eight components of standards, illustrated with a mathematics skill standard, drawn from Oregon's Proficiency-based Admission Standards System (PASS). The chapter also discusses opportunity-to-learn standards and gives two examples of performance-standard systems.

Chapter 3 describes initiatives and work on standards at the international, national, state, and local levels. Finally, chapter 4 examines the future of standards.

Chapter 1

Types of Standards

Complicating the discussion of performance standards is the variety of types of standards. There are at least four primary types of standards: (1) academic-learning standards, (2) intellectual and social-skill standards, (3) generic work-readiness standards, and (4) industry-skill standards. An additional type of standard commonly mentioned, the performance standard, is included as one element in the description of the components of a standard. Curriculum, or program, standards represent one more type of standard. However, these standards "are best characterized as descriptions of what should take place in the classroom; as such, they address instructional techniques, recommended activities, and various models of presentation" (Kendall and Marzano 1995). They do not meet the criteria listed above for being included in this discussion.

These four categories of standards provide a more precise description of expected student performance and help to eliminate some of the confusion that accompanied initial attempts to specify student learning in terms of performance. In the sections that follow, I consider these four basic types of standards and provide examples of each.

Academic-Learning Standards

As their name implies, academic-learning standards focus on student academic knowledge and skill generally in areas familiar to parents, teachers, and students. Academic-learning standards are organized into disciplinary categories such as math, science, social sciences (or history, civics, economics, geography, sociology, psychology, anthropology), foreign (or second) languages, English (or humanities and literature), and visual and performing arts.

Within these categories the knowledge and skills a student must retain and apply are clearly delineated and appropriate assessments are developed. The assessments may take the form of traditional paper-and- pencil tests or may involve more application of knowledge in the form of problem-solving, for example. The standards can be interdisciplinary in nature, requiring students to apply information learned in one discipline to problems generated in another.

Academic-learning standards generally have two dimensions: content knowledge and cognitive skills. Content knowledge is identified clearly. Can the student factor a polynomial, specify the components of a theory, identify geographical locations and features, use basic vocabulary to answer questions, apply several writing styles as appropriate, critique a piece of art by identifying the styles and influences present in it?

Process skills cut across content areas and are embedded within academic-content knowledge. Can the student solve a problem in math, science, or social sciences? Can the student analyze divergent points of view or seemingly conflicting information in science or literature to reach an independent conclusion or verify someone else's conclusion? Can the student construct an argument in writing to defend a point of view? Can the student use a variety of sources appropriately to research a topic and present conclusions in writing? These skills are key to understanding academic content but are not necessarily specific to a particular discipline.

Intellectual and Social-Skill Standards

This category includes areas that are more difficult to specify but are extremely important complements to the more content-oriented academic-learning standards. The first wave of "outcomes" tended to emphasize these more generic skill categories over content knowledge. Although these skills are critically important, many of the initial advocates of outcome-based learning perhaps overlooked the fact that all intellectual processes can only be demonstrated in the context of challenging content. For example, problem-solving as a skill has no meaning without a content framework within which to solve problems.

The linkage of content and process is inextricable. Therefore, to identify separate process skills is somewhat arbitrary. However, identifying them does indicate their importance.

The following examples delineate many of the commonly cited intellectual and social skills. Accompanying each skill is an extended definition

that helps teachers and students understand better the nature of the skill and suggests how it should be taught, developed, and extended as challenging content is mastered. Furthermore, the extended definition suggests many things that should be built into any assessment of content knowledge, thereby allowing these process skills to be assessed in the context of challenging content.

• *Reading* is the process of decoding abstract symbols to understand their underlying message or meanings. Effective readers employ a variety of strategies to improve comprehension, to self-correct, and to discover meaning in many types of text. A fluent reader can interpret a writer's literal and inferential meaning, recognize the differing goals of different types of writing, use all the features of a written document (for example, tables, index, appendices, footnotes), vary the method of reading (skim, review, survey, analyze), and make connections between texts and personal experiences. Reading is undertaken for a variety of reasons, including enjoyment, information acquisition, comprehension, and critical analysis.

• *Writing* is a tool for learning, for communication, and for self-reflection. Writing may serve to inform, stimulate, and challenge a variety of audiences. The writer organizes and clarifies her or his thinking so that it is comprehensible, informative, moving, or entertaining to others when read. Conventions of writing, including grammar, syntax, spelling, structure, and voice, must be understood and mastered. The writing process contains a number of recursive dimensions, including prewriting, drafting, organizing, revising, editing, and critiquing. Effective writers employ a variety of written forms (for example, stories, essays, journals, technical reports, poetry, research papers) and can evaluate, monitor, and critique their own writing to produce a coherent and polished result.

• *Communication competence* includes both the skills of listening and speaking. Competent oral expression comprises the ability to ask clarifying and extending questions, express generalizations discovered through investigations, debate, persuade, initiate and sustain conversations, present feelings and emotions, share and exchange ideas and opinions, give directions, and critique oral presentations. It involves verbal and nonverbal behaviors and the ability to employ and to decode each appropriately.

• *Analytic thinking* is the ability to apply deductive and inductive thinking; make and test conjectures; follow logical arguments; judge the

validity of arguments; construct simple valid proofs; understand and apply reasoning processes; develop appropriate criteria for analyzing data or opinions; distinguish fact from belief; identify cause and effect; and respond to multiple perspectives. Analytic thinking is necessary in all areas of study from the fine arts to mathematics.

• *Problem-solving* is a series of skills, some systematic, some intuitive, that are developed over time as the result of attempting many complex, nonstandardized problems. Problem-solving may be inductive, deductive, or nonlinear. Effective problem-solvers employ many of the following techniques: identifying the critical elements of the problem; developing multistep solutions in a nonroutine fashion; generalizing familiar solutions and strategies to new problems and situations; generating alternative solutions and strategies for familiar problems and situations; conducting systematic observations and investigations to collect data; and considering the implications and unintended effects of proposed solutions.

• *Technology as a learning tool* means coming to view any technology as an extension and enhancement of the human mind, not as a separate mechanical system. While the use of technology requires content knowledge, a vital key is the process ability to integrate the technology to facilitate inquiry, understanding, and production of knowledge. Using technology includes such skills as knowing how to operate and when to employ computers, online databases, telephones, fax machines, electronic mail and bulletin boards, and calculators. It also includes operation and use of audiovisual and multimedia tools, including video cameras and recorders, projection systems, LCD panels, CD-ROMs, sound-recording devices, and slide projectors. There is a hardware and software dimension to many technologies. Competent learners master both, with greater emphasis on the potentialities of the software dimension.

• *Teamwork* encompasses the social dimensions of learning and doing. A learner who is proficient at learning socially works well with others to create products, solve problems, reach consensus, negotiate, and cope with conflict. Effective team members understand the diversity present in any group and how it affects performance and goal attainment; demonstrate an understanding of the various roles present in groups; show the capacity to lead and follow, depending on the situation; understand the balance between individual and group contributions and responsibilities; understand both individual and group accountability; and show awareness of the role and potential uses of humor when people work together.

• *Integrative thinking* requires an understanding of the interactions within, between, and among natural, social, organizational, and technological systems, and the relationship of the individual to such interactions. Integrative thinking uses or combines information from a variety of disciplines in an integrated fashion to demonstrate understanding of the world, and to solve problems or create products. Integrative thinking requires the ability to synthesize and integrate information and observations from the parts to form a new pattern or framework for comprehending the whole.

• *Quality work* is the relative degree of excellence present in a student's work as compared to defined standards or criteria. Quality work may be evaluated along any of a number of dimensions, including its content, structure, presentation, insights, conclusions, or entertainment value. To assess quality, students must be capable of comparing their work continuously to internal and external standards. Schools striving for quality create an ethos in which the nature of quality is discussed and standards for achieving quality are identified. Quality work involves ongoing critique and evaluation of products as they evolve. Students with an understanding of quality can describe the nature of quality and of standards and can critique and evaluate the quality of products as they are being developed and when they are completed (Conley and Tell 1996).

Generic Work-Readiness Standards

Whereas employment-skill standards are industry-specific, generic work-readiness standards cut across all lines of work. They describe what a student must learn to be successful in the work world, regardless of chosen or preferred occupation. A number of national studies have sought to determine what employers identify as generic work-readiness needs of prospective employees. Perhaps the two most influential have been *Workplace Basics: The Skills Employers Want* (Carnevale, Gainer, and Meltzer 1990) and the SCANS Report (Secretary's Commission on Achieving Necessary Skills 1991).

Employers are not asking schools to prepare workers via the old vocational or business-education model, where schools train students to use very specific equipment in very specific ways. Instead, they ask schools to ensure workers can do the following types of things, summarized from the two reports, in a highly competent manner:

- Read, write, speak clearly and accurately, listen and follow directions appropriately and safely, perform basic mathematical

operations without error.

- Think creatively, make decisions, solve problems.
- Know how to learn, expect and continue to learn throughout their work life.
- Demonstrate personal responsibility; set and achieve personal goals; have pride in themselves, their work, and their ability to be successful.
- Possess the interpersonal skills necessary to work as a team member to achieve a goal, teach others, and serve customers.
- Develop the ability to assume responsibility and motivate coworkers when necessary.
- Perceive their role within the organization, understand the organization's goals and their contributions to those goals.

Workers are also expected to have additional competencies, including the following:

- Ability to allocate time, money, and materials wisely.
- Ability to acquire and evaluate data, organize and maintain files or other information systems, use computers to interpret data.
- Ability to select and operate appropriate equipment and tools safely.
- Ability to remain free of alcohol and drugs and be punctual and properly prepared for work.

Industry-Skill Standards

These standards are related to specific categories of employment and attempt to define what skills a student should be mastering to enter a particular field of employment. Industry-skill standards can apply to a category of work, such as industrial manufacturing, tourism, or business management, or to a specific industry, such as printing. They fill the gap left by the demise of union-apprenticeship programs and by the inability of school-based vocational-education programs to keep pace with a rapidly changing work world.

These standards identify the new skill mix required to work in a particular occupation and suggest what students should be doing to prepare accordingly. More specific than generic work-readiness standards, they suggest the types of preparatory experiences students should seek if they have an interest in a particular field. Such information is particularly useful when developing career-awareness programs and, for older children, school-to-work opportunities.

The development of industry standards began during the Bush Admin-

istration when the U.S. Departments of Labor and Education mounted a collaborative effort to develop a national system of voluntary industry-based skill standards. This activity involved representatives from twenty-two industries and industry groups. Grants were awarded in industries such as electronics, printing, biotechnical sciences, and metals. These grants required the industry group to produce a clear set of skills needed by workers to enter the industry and perform successfully. Since many industries have numerous types of entry-level positions, the process was complex.

The Clinton Administration continued this effort through the Goals 2000: Educate America Act (1994). This act established a twenty-eight-member National Skill Standards Board to review, endorse, and further implement the standards.

States have begun the process of adapting the detailed industry skill standards to the more general educational programs that characterize high schools. In this process, states attempt to balance the types of generic work-readiness skills listed previously with the more specific competencies needed in a particular occupation or job cluster within an industry or industry group.

For example, the National Retail Federation (1994) identified a series of "modules" that characterized the skills needed for retail sales. Each module contains more detailed specifications of the behaviors necessary to do this type of job successfully. The modules are like standards with proficiencies and indicators. Here are the standards identified for Professional Sales Associates. Full detail is provided only for the first proficiency and its associated indicators:

Module 1: Provide Personalized Customer Service

1.1 Initiate Customer Contact

- 1.1.1 Determine customer's needs by listening and asking questions
- 1.1.2 Make shopping experience enjoyable for customer
- 1.1.3 Give customer appropriate greeting
- 1.1.4 Direct customer to additional services such as delivery, alterations, gift wrapping
- 1.1.5 Refer customer to another department/store

1.2 Build Customer Relations

Module 2: Sell and Promote Products

Module 3: Monitor Inventory

Module 4: Maintain Appearance of Department/Store

Module 5: Protect Company Assets

Module 6: Work as Part of a Department/Store Team (Schray 1995, pp. 41-46).

These standards embody a task analysis of the behaviors an employer would expect from a worker in this area of employment. While they may suggest some learning activities that would help students develop such skills, most people, educators and business leaders alike, would agree that schools are not the most appropriate place for such specific job training to occur. At the very least, it would be impractical for schools to address the complexity present in the economy through specific training programs. Gone are the days when wood shop, auto shop, metals, drafting, business classes, and home economics were adequate to prepare students for most categories of employment.

In Oregon, Schray (1995) reported on proficiency standards from a state-level development process in the area of business and management. These standards were generic to all business and management positions; at the same time, they were referenced to more detailed standards such as those of the National Retail Federation. The result was ten general proficiency standards, each with more detailed "extended definitions" that function as proficiency indicators. This project went further to provide suggested instruction, curriculum, and assessment models along with instructional strategies and curricular suggestions. The ten proficiency standards follow. Extended definitions are provided for two of the standards: the first standard, to suggest the structure of all ten, and the seventh standard, to show its link to the business-skill standards above.

1.0 Understand and apply economic principles

The student will be able to analyze, interpret, and communicate the application of economic principles at local, state, regional, national, and global levels.

Extended Definitions:

1.1 Supply-and-demand principles

1.2 Business cycles and competition

1.3 The role and impact of government and regulations in economics

1.4 Monetary and fiscal policies

1.5 The impact of cultural and environmental issues and conditions on economics

1.6 Personnel practices; management, employee, and labor-union issues

1.7 Economic history, research, and forecasting techniques

1.8 International trade

2.0 Implement standard business practices and procedures

3.0 Develop business-career potential

4.0 Communicate effectively in a business environment

5.0 Manage business records and documents efficiently

6.0 Analyze and interpret business trends and operations

7.0 Promote products and services convincingly

Extended Definitions:

7.1 Identify audiences and potential customers for company products and services

7.2 Plan strategies for the presentation of products and services that promote sales

7.3 Evaluate the following influences on products and services: competition and changes in economic, legal, political, social, cultural, environmental, and technological factors

7.4 Organize various methods of presenting products that meet the needs of different audiences and customers

7.5 Promote product and service benefit to customers

7.6 Utilize professional selling techniques to gain customer acceptance of products and services

7.7 Assess the effectiveness of presentational, promotional, and selling activities

8.0 Collaborate for business problem-solving and strategic planning

9.0 Utilize time, personnel, and material resources effectively

10.0 Understand and comply with legal, health, and safety require ments (pp. 21-40)

These standards would also guide development of "contextual learning experiences," where all students, regardless of their career aspirations or postsecondary plans, would be able to share a common learning experience, then apply it in terms of their future aspirations. Students might engage in a simulated business experience, for example, then produce different products depending on whether they intended to go directly to a four-year college, to community college, or to the world of work. The standards would also frame "school-to-work" experiences in which students would receive firsthand exposure to an actual work site through avenues such as job shadows, mentoring, and project-based learning.

Chapter 2

Components of a Standard

Academic standards generally have several distinct components, each of which is designed to provide successively greater clarity and detail to permit teacher, student, and parent to know what is expected of them, and to allow appropriate assessments to be developed. Without adequate clarity, teachers do not know what to teach, students do not know what to learn, and no one knows what to assess. Therefore, most standards contain the following eight elements:

1. *Performance area*: The performance area is a general statement of the field of study or skill to be mastered.

2. *Extended definition*: This statement gives a more detailed explanation of the performance area, indicating the desired emphases to be given within the field of study and often defining the area more precisely.

3. *Proficiencies or competencies*: These statements describe the knowledge or skills students are expected to master. A proficiency or competency is not a detailed description of the curriculum to be taught or a list of everything the student should know after completing a course of study. Instead, it may identify key "capstone" skills that can only be demonstrated if a series of prerequisite skills have been mastered. The proficiency may also define skills or knowledge that would only be gained in the context of more exhaustive study.

4. *Proficiency indicators*: Specifying the proficiencies in more detail, the indicators are the bridge to the design of curriculum and assessment. They provide enough detail to allow teachers to know what to teach and to permit assessments to be designed.

5. *Performance standards*: This component designates the level of performance students must attain to meet the standard. Each standard must have a level that is designated "adequate," "proficient," or "acceptable." This

standard tells the learner and teacher what must be demonstrated for the standard to be designated as achieved. Performance standards

> specify "how good is good enough." They relate to issues of assessment that gauge the degree to which content standards have been attained.... [T]hey are the indices of quality that specify how adept or competent a student demonstration must be. A performance standard indicates both the nature of the evidence (such as an essay, mathematical proof, scientific experiment, project, exam, or combination of these) required to demonstrate that the content standard has been met and the quality of student performance that will be deemed acceptable. (Malcom 1993)

6. *Performance levels*: The performance levels designate the behaviors, skills, knowledge, and demonstrations that precede and exceed adequate performance. The performance levels combined with the performance standard compose a rating scale for the standard. This scale may take the form of numbers (1-5), role descriptions (novice, proficient, expert), development levels (emergent, fluent, advanced), other more "judgmental" categories (minimal, acceptable, outstanding), or even letters (A-F). The performance level and assessment method are very closely interrelated. Sometimes the reporting method of the assessment and the performance levels are synonymous.

7. *Knowledge domain*: This component states the total amount of knowledge and information the student is expected to master, regardless of what specifically is assessed within the domain. Stated differently, the knowledge domain represents the assumed knowledge students have, both for the purpose of assessing that knowledge and for constructing further learnings.

8. *Assessment method*: A method of assessment is used to determine whether the standard is achieved. Each proficiency might have its own assessment method, or one assessment might provide information on multiple proficiencies. In some cases the assessment method and performance level will be the same. In others, the assessment will allow for multiple levels of performance.

Example of a Standard

The following example of an academic-skill standard contains the elements listed above, except the knowledge domain and performance levels, which have not been included because of space limitations. It is drawn from Oregon's Proficiency-based Admission Standards System (PASS). Students

will be required to demonstrate their skill on forty-nine proficiencies at prescribed levels to be eligible for admission to college. The following example is one of eight proficiencies in mathematics where students would be required to demonstrate knowledge and skill:

Mathematics Proficiency E

Proficiency:

Utilize probability and statistics in the study of various disciplines, situations, and problems; understand and apply valid statistical methods and measures of central tendency, variability, and correlation in the collection, organization, analysis, and interpretation of data.

Indicators:

1. Extract and interpret descriptive statistics from data.
2. Prepare graphs and charts such as histograms, scattergrams, and box plots.
3. Analyze and interpret statistical graphs and charts.
4. Compare sets of data in terms of variability, measures of central tendency (e.g., mean, median, mode, standard deviation), and correlation.
5. Determine experimental and theoretical probabilities, compare probabilities, and use either, as appropriate, to represent and solve problems involving uncertainty.
6. Understand and apply the concept of a random variable to generate and interpret probability distributions.
7. Recognize and utilize valid sampling techniques in drawing inferences.
8. Use probability and statistics to examine the validity of a claim, test a hypothesis, study a problem, or make defensible predictions based on data.

Performance standard:

Proficient performance consists of the following elements:

Criterion 1: using probability concepts and models to represent and interpret a situation or problem

The student:

- selects and uses appropriate probability concepts, models, or simulations
- uses appropriate and exact diagrams, tables, lists, fractions, and decimals to represent probabilities
- utilizes probability concepts to ensure appropriate investigative

design, sampling, data analysis, and/or interpretation/conclusions

Criterion 2: collecting data through statistical investigations, experiments, simulations, or surveys

The student:

- poses a question, hypothesis, or prediction which can be investigated through the use of statistical methods, and/or probability simulation
- plans, tests, and critiques investigative designs (and/or surveys), considering issues of randomization, appropriate data, and effective data-gathering techniques
- develops an investigation of reasonable complexity, depth, and importance to the discipline or context
- collects and organizes a reasonable size database, identifying appropriate variables and fields

Criterion 3: summarizing, presenting, and analyzing data

The student:

- uses appropriate mathematical symbols, terms, calculation methods, and technology to compute and represent statistics accurately
- selects and uses appropriate tables, plots, and graphical displays to accurately represent and study data; reads and interprets graphical displays correctly
- correctly applies concepts and statistical measures of frequency, central tendency, variance, and correlation in the representation and analysis of data

Criterion 4: interpreting data and developing conclusions related to the question, claim, hypothesis, or prediction and the discipline or situation being investigated

The student:

- clearly and correctly explains information represented in summary statistics, tables, and graphs
- draws inferences or makes predictions that are related to the original question/hypothesis and that are supported by the data collected
- reviews and critiques the investigative design, data collection, and analysis for sources of error and bias

- develops conclusions appropriate to the situation investigated

Criterion 5: reporting the investigation and interpretation: representing data, using statistical evidence appropriately, expressing ideas

The student:

- represents data, mathematics, and thinking clearly and completely
- uses statistical evidence appropriately, considering the situation and audience
- develops and expresses ideas coherently

Assessment Guidelines:

Mathematics Proficiency E requires that students know fundamental concepts of probability and statistics and be able to use those concepts in the investigation of various disciplines, situations, and problems. Demonstration of the proficiency implies demonstration of understanding, application in original investigations involving data analysis, and application in more than one context. Understanding of the mathematical concepts and skills represented in the Domain of Knowledge chart could be assessed through tests, classroom exercises, or projects in which those concepts must be used and exhibited.

The student could design and conduct investigations, simulations, experiments, or surveys. Students could demonstrate their abilities through a series of activities or a longer term project involving either group or individual investigation, but each student must be held accountable for and assessed on her/his own representation, analysis, and interpretation of data. A teacher verification of this proficiency implies the combining of information from multiple assessments.

Because the proficiency stresses varied disciplines and situations, it lends itself to cross-curricular demonstrations, particularly in science and social studies (see Science E and Social Sciences K). Demonstration of the proficiency should also involve the demonstration of process proficiencies in Analytical Thinking, Problem-solving, Technology, Quality Work, and other process or content proficiencies. (PASS Project 1996)

This sample proficiency illustrates various elements of an academic standard. In doing so, it not only suggests the possible rigor or challenge that can be achieved through the use of a standard, but also the tremendous distance most schools would have to travel to be prepared to expect such performance from most or all students, to teach in ways that allowed students

to reach this level of performance, and to assess students in a reliable and valid fashion to determine if they meet the standard.

Another Type of Standard: Opportunity To Learn

Opportunity-to-learn standards are frequently discussed at the policy level in states and in the federal government when performance-based learning systems are being considered. The Council of Chief State School Officers (1995) states that opportunity-to-learn standards

> describe the circumstances and conditions provided to ensure that each student has the quality of personnel, courses, curriculum, materials, technologies, instructional time, working space, financing, procedures for placement, provisions for special aid, and other services necessary to achieve content and student performance standards.

Opportunity-to-learn standards relate not to student learning but to the conditions that surround student learning. They are among the most controversial standards, in part because they are seen by some as a possible excuse educators could use if students did not achieve standards. However, they are important to consider in situations where the standards applied to students have high stakes, in other words, if achievement of the standard by the student is the prerequisite for something of value (diploma, college admission, promotion to the next grade). In such cases, considerations of equity demand that all students have roughly the same opportunity to learn. This principle is relatively easy to agree upon; it is much more difficult to translate into practice.

But at its most basic level opportunity-to-learn has come to mean that students have access to the rudiments necessary to perform to the expected standard: teachers who know the material, adequate physical resources, and a learning environment that can conceivably prepare them to reach the standard. Unfortunately, far too many students currently lack access to even these rudimentary elements and will never be able to reach high standards. Opportunity-to-learn standards remind policy-makers that setting standards alone is not enough; simply putting the responsibility on the student does not solve the problem if the student is not given a reasonable opportunity to learn what is necessary to master the standard. The system has some responsibilities as well.

Two Examples of Current Performance-Standard Systems

Performance standards are used in several areas already. Although few

American schools have managed to institute a system that is fully performance-based, many students already are being judged against external standards.

Advanced Placement Program. The College Board's Advanced Placement (A.P.) program is an example of a performance-based system. While A.P. teachers are free, and even encouraged, to teach in the ways they find most appropriate given their students and their own teaching methods, all students who take A.P. classes eventually take the same test if they wish to receive an A.P. score from The College Board. The A.P. exams are developed centrally by The College Board, generally under the supervision of Educational Testing Service, and administered nationally.

Teachers do not score their own students' exams. Instead, exams are returned to The College Board, which organizes the scoring process. Trained scorers are assembled who then review the exams and rate them against a common scoring system on a 1-5 scale. Safeguards exist to ensure interrater reliability and validity for the scoring. Students then receive a score from 1 to 5 on the exam.

Victorian Certificate of Education. The state of Victoria in Australia converted to a standards-based system in 1990. This system, known as the Victorian Certificate of Education, or VCE, applies to all students in the state. The VCE relies on Work Requirements and Common Assessment Tasks (CATs) that change regularly to determine student proficiency. Teachers are sent detailed information on new CATs as they are developed. The teachers and their students then work together to develop the knowledge and skills needed to perform well on the CAT. The teacher serves as a guide and coach, providing regular feedback as well as instruction.

As the student's work approaches a stage where it is ready to meet the specified criteria for the CAT under study, the intensity increases. Students submit their final work, which may be judged by their teacher, by other teachers in the school, or by teachers at other schools.

Quality control is maintained through administration of the General Achievement Test, a traditional paper-and-pencil standardized-test format developed specifically to provide validation of the scores Victorian students receive on their CATs. If the scores students in a particular school are receiving on their CATs are out of line with the scores predicted by their GAT scores, the work from that school is rescored en masse, and a student's score may be adjusted upward or downward. Such quality-control measures help ensure high fidelity of interpretation of standards by Victorian teachers (Victorian Board of Studies 1995).

Chapter 3

International, National, State, and Local Standards

International comparisons of educational systems were the basis for much of the original criticism of American schools. They were found lacking when ranked against other industrialized countries in areas such as math and science. The initial frame of reference, then, for standards was that they be "world class," that they enable American students to compete with other children in an increasingly global economy. Setting aside for the moment the issue of the accuracy and even the significance of such rankings, standard-setters encountered a host of problems trying to develop comparable standards among national educational systems and across cultures. As Linn and Baker (1995) observed:

> It is relatively easy to set arbitrary cutscores on an international assessment such as the identification of selected percentiles in leading countries (e.g., the use of the 25th, 75th, and 90th as minimal, acceptable, and outstanding levels of achievement). However, such cutscores cannot be expected to correspond to performance standards that are derived from established content standards and a consensus judgment that the assessment evidence supports the conclusion that students have achieved at an acceptable or outstanding level.

Resnick, Nolan, and Resnick (1995) conducted extensive analysis of mathematics standards in France and The Netherlands to determine both the issues involved in comparing performance between the countries and the lessons America might learn from the approach to standards taken by these two countries. They concluded it is feasible to make comparisons among countries, but that such an "international benchmarking model"

> calls for a set of common questions to be posed of educational systems in comparison states: What is the structure of schooling in other

countries? What are students expected to know and be able to do? What kinds of performances are used to demonstrate competence? What counts as "good enough" in these performances? What portion of students is meeting the standard? What reform efforts are underway? Responses to these questions are used to display defining features of different systems in social, institutional, and cultural contexts.

Other questions will have to be posed about strategies for ongoing professional development, engagement of parents, school size, and motivation of students to achieve.

While Resnick and others are optimistic about the ultimate feasibility of comparing national performance to international benchmarks, their work points out the complexity of the process. Politicians and the public have been more interested to date in "cutscores," simple numbers that tell which country is doing "better" than the others. Creating comparisons that can be used in policy-making processes and public discussions will be challenging, particularly in subject areas that are inherently more culturally dependent, such as social sciences. For the time being, most of the judgments about how well students are reaching standards will likely be in the form of comparisons among states within the United States.

National Standards

Standard-setting in this country began in earnest at a meeting convened by then-President Bush and the National Governors' Association in Charlottesville, Virginia, in September 1989. The NGA, chaired at the time by Arkansas Governor Bill Clinton, reached consensus with President Bush that the nation should set goals for improving the educational system. From this bipartisan process was born in March 1990 America 2000 and its six goals, the first national goals for education. This was a voluntary approach whereby the states would be free to adopt their own standards, but the federal government funded national curriculum organizations to create model standards in seven commonly taught areas including science, geography, history, civics, English, foreign languages, and the arts. In four other areas, curriculum groups proceeded without federal funds.

These goals were very general in nature and were as concerned with the processes and context of learning as with learner competencies. Only goals 3, 4, and 5 contained reference to enhanced skills and implied performance levels. The original six were:

1. All students will start school each day ready to learn.
2. The high school graduation rate will increase by the year 2000 to at least 90 percent.
3. Students will leave grades 4, 8, and 12 with demonstrated competency in challenging subject matter.
4. American students will be first in the world in mathematics and science.
5. Every adult will be literate and will possess the knowledge and skills to compete in a global economy.
6. Every school will be free of drugs and violence and will offer a disciplined environment conducive to learning.

The role of national goals became more elaborate and ambitious when Governor Clinton became President Clinton. He reshaped America 2000 into Goals 2000 and created mechanisms for creating model national standards. The National Education Goals Panel had released recommendations in 1991 for a system to measure progress toward the National Education Goals. It recommended creation of "a national assessment system to measure student achievement in key subject areas, a 'child-development profile' to gauge children's readiness for schooling, and a student-identification system to track students across districts and states" (Rothman, April 3, 1991).

Goals 2000 continued funding for model standards begun under America 2000. It also included provisions for creating the National Education Standards and Improvement Council and an expanded National Education Goals Panel. These groups would have statutory authority to review standards from federal projects, states, publishers, local districts, and others, and determine whether to "endorse" them or not. This plan for a federal "Good Housekeeping Seal of Approval" for standards never came to fruition because of concerns raised about the possible creation of one set of national educational standards.

State Initiatives

State efforts had been initiated around the same time many of the national standard efforts were undertaken, so that by August 1995 twenty-five states had content standards developed in at least some subject areas, and nineteen states had projects in progress (Council of Chief State School Officers 1995). These projects vary in quality and level of ambition. They represent the first time states have attempted to specify the results their educational systems will achieve in terms other than test scores.

Most states had curriculum objectives or frameworks, but these did not

make clear what students were to be expected to know, only what was to be taught. Standards projects often translate these curriculum documents into student-performance terms and define or imply new assessment methods necessary to ascertain student skill and knowledge in the designated areas.

Obstacles Facing School Districts

Many local school districts have developed their own standards over the past five years. These efforts have proved to be somewhat transitory for the most part. It is exceedingly difficult for one school district to enforce higher standards than other districts. Parental support may dwindle if some parents are told their children do not meet the standard, or if children bring home "report cards" that do not contain the familiar A-F markings. Parents will be unable to compare their child's performance to their own when they were in school, or to that of children of relatives or friends from other school districts. Many parents worry that their children will be at a disadvantage for college admission if their progress is reported in any form other than course-based grades.

So, while some districts make concerted efforts to implement systemwide standards (for example, the Thompson School District in Loveland, Colorado), such efforts are difficult if they do not occur in a broader context within a state that requires districts to adopt local standards or comply with state standards. As of mid-1996 only a few states had completely implemented statewide standard-and-assessment systems, and few local districts had made the transition to standards, except on a limited scale. Large-scale implementation remains the next challenge for standards-based education.

Chapter 4

The Future of Standards

Educational standards face an uncertain future. The idea is attractive on the surface, but the reality of developing them and instituting practices to support them has proved problematic.

Who, then, supports standards? Legislators often do until specific groups object to specific standards. Educators may support them until they realize the amount of change required to have all students achieve them, and the possibility that schools (and teachers) might be held accountable for students not achieving the standards. Parents support them in the abstract, for other people's children, but often become concerned if it looks like their children might not reach the standard, or if the changes required by a standards-based system might affect their children's access to higher education. Students can hardly be expected to be the advocates for higher standards. As bored and unchallenged as some are, few see more demanding school work as the answer to their disaffection.

Where can advocates look for a constituent group to serve as the champion of standards? To date, business is the primary advocate of educational standards, the group that has provided the most consistent support, from David Kearns (Kearns 1988, Kearns and Doyle 1988), former CEO of Xerox, to Louis Gerstner, former CEO of RJR Nabisco (sponsor of the Next Century Schools program) and CEO of IBM. Business has several reasons to support standards.

First, the language of standards is familiar to business. American industry has had to embrace standards and quality over the past two decades to remain competitive. During this time, many industries have grown accustomed to the language and culture of standards. They have little difficulty applying these concepts to education.

Second, business sees itself as a "consumer" of the "products" of the education system. Graduates become employees. Many business leaders point to the amount they spend on remediation of entry-level workers as justification enough for higher educational standards.

Third, though less frequently stated, many industries simply need smarter consumers and workers to function at all. The joke about VCRs that flash 12:00 for years after they are purchased only begins to describe how products have often become more complex and consumers less competent. Companies now spend more and more on 1-800 services to explain to consumers how to use their products. A more highly educated consumer would be more capable of reading and understanding instructions, using product features, understanding what to do if simple problems arise with products, communicating with a customer representative about the nature of problems they encounter with products, and providing feedback on how to improve products. Some Americans are certainly able to do these things, but many are not. Intelligent consumers will support intelligent products.

Similarly, workers must follow more complex safety and production procedures and rules. They must be more cognizant of their actions and the implications of any errors they make. They must think, solve problems, and anticipate breakdowns for the organization, whether it is production- or service-oriented, to function effectively. Well-educated workers are now a key variable in the productivity equation.

A potential third constituent group has shown only peripheral interest in the standards movement to date (Conley 1996). The nation's colleges and universities have long decried a perceived decrease in the knowledge and skills that each successive class of freshmen seems to bring with it. Grade-point averages have increased more or less continuously since the mid-1960s, while other measures of knowledge and skill have held constant or have decreased over the same period. Grades increase but performance does not.

One side effect is an increase in the proportion of students who are admitted to college as being fully qualified, but must immediately enroll in remedial courses to participate in the required program of study. It is not unusual for half the students in many colleges throughout the nation to need remediation in mathematics and nearly as many in writing. The California State University system, which by law must draw from the top one-third of the graduating class, has seen remediation rates top 45 percent.

This phenomenon not only lowers the academic expectations that colleges can have for their students, but it lengthens the time students must stay in college to graduate. The cost of a college education continues to rise,

and with it the expectations students and parents have of success. And as enrollment in most public colleges remains relatively constant, legislators will expect a larger proportion of admitted students to move quickly (and successfully) through the system, rather than building new campuses. Moreover, legislators find it hard to understand why college students are learning (and receiving credit for) exactly the same material they were taught in high school a year before.

These forces may converge to see higher education institutions support standards as a consistent quality-control tool that does what grades no longer do: ensure that a student is prepared to do college-level work successfully (Conley 1996b).

Will the support of business be enough to sustain standards? Probably not. Much depends on educators both in the public schools and in colleges and universities. Will they come to view standards as tools that make them more effective, that enhance their ability to hold students to high expectations and performances? Will teachers perceive standards as tools that help them engage students in challenging learning?

Standards can provide a rationale and justification for curriculum material and tests. Furthermore, standards can provide a basis for grades that cannot be challenged or manipulated by students (or parents). If educators come to see these benefits as warranting all the difficulty involved in adopting standards, at least two constituencies will then support the implementation of standards in American schools. Educators and businesses leaders may then be able to assuage nervous parents and inconsistent legislatures.

If the standards movement is abandoned altogether, the future of American education is less clear, with more than 15,000 school districts, 110,000 schools, and 2,000,000 teachers essentially setting their own standards. Few other public educational systems in the world are allowing such variability in student performance at a time when national boundaries offer little protection from competition and comparison among nations, and the need for an educated citizenry and skilled work force within each nation is increasing dramatically.

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